Executive Summary
Conclusions and Recommendations

Abstract

This Report of the Railroad Safety Advisory Committee (RSAC) describes the status of efforts to develop, test, demonstrate and deploy Positive Train Control (PTC) systems and describes actions that should be taken to provide an appropriate climate for implementation of those systems. The report focuses on the safety dimensions of PTC, but also addresses other benefits that railroads and the society at large may realize if PTC is implemented successfully and at a sustainable cost. The report sounds a cautionary note, because railroads and suppliers are currently estimating very substantial costs for implementation of the more capable forms of PTC. Many railroads believe that they have identified means of enhancing the efficiency of their operations and the quality of their service without the necessity of deploying PTC systems, as such.

On the other hand, planned investments in enhanced computer-aided dispatching, locomotive cab electronics, and position tracking could be expected to reduce the cost of implementing PTC systems in the future, and today's substantial costs for wayside components could be expected to decline when firm investment decisions are made on a large scale. Accordingly, the RSAC will continue to support efforts to promote and develop PTC systems. The major freight railroads have joined the State of Illinois and the Federal Railroad Administration (FRA) in launching development of a version of PTC that could serve as the foundation for mixed freight and high-speed passenger operations, providing enhanced system capacity as well as ensuring a very high level of safety. Other planned safety-relevant projects, which in general are intended to "overlay" rather than replace the primary means of controlling trains and protecting roadway workers, will be evaluated to ensure that they will achieve acceptable levels of safety when implemented. The Committee recommends additional actions that can contribute to a favorable climate for deployment of PTC systems in the future.

Background

Since the early 1920s, systems have been in use that can intervene by warning crews or causing trains to stop if they are not being operated safely because of inattention, misinterpretation of wayside signal indications, or incapacitation of the crew. Pursuant to orders of the Interstate Commerce Commission (ICC),[1] cab signal systems, automatic train control and automatic train stop systems were deployed on a significant portion of the national rail system to supplement and enforce the indications of wayside signals. However, these systems were expensive to install and maintain, and with the decline of intercity passenger service following the Second World War, the ICC allowed many of these systems to be discontinued. During this period railroads were heavily regulated with respect to rates and service responsibilities. The development of the Interstate Highway System and other factors led to reductions in the railroads' revenues without regulatory relief, leading to bankruptcies and eventual abandonment of many rail lines. During this period,

[1]The ICC's safety regulatory activities were transferred to the Federal Railroad Administration (FRA) when the FRA was established in 1967.

railroad managers focused on survival, and investments in expensive relay-based train control technology were economically out of reach. Meanwhile, National Transportation Safety Board investigations of train collisions led to recommendations for implementation of collision avoidance systems.

Enactment of the Staggers Rail Act of 1980 signaled a shift in public policy that permitted the railroads to shed unprofitable lines, largely replace published "tariffs" with appropriately priced contract rates, and generally respond to marketplace realities, which increasingly demanded flexible service options responsive to customer needs. The advent of microprocessor-based electronic control systems and digital data radio technology during the mid-1980s led the freight railroad industry, through the Association of American Railroads (AAR) and the Railway Association of Canada, to explore the development of Advanced Train Control Systems (ATCS). With broad participation by suppliers, railroads and the FRA, detailed specifications were developed for a multi-level "open" architecture that would permit participation by many suppliers while ensuring that systems deployed on various railroads would work in harmony as trains crossed corporate boundaries. ATCS was intended to serve a variety of business purposes, in addition to enhancing the safety of train operations.

Pilot versions of ATCS and a similar system known as Advanced Railroad Electronic Systems (ARES) were tested successfully, but the systems were never deployed on a wide scale. However, sub-elements of these systems are employed for various purposes, particularly for replacement of pole lines associated with signal systems.

Collisions, derailments, and incursions into work zones used by roadway workers continued as a result of the absence of effective enforcement systems designed to compensate for effects of fatigue and other human factors. Renewed emphasis on rules compliance and Federal regulatory initiatives, including rules for control of alcohol and drug use in railroad operations, requirements for qualification and certification of locomotive engineers, and negotiated rules for roadway worker protection led to some reduction in risk, but tragic loss of life and property continued to occur.

Over the past decade and a half, the railroad safety record has improved significantly while the railroads handled considerably more traffic. Nevertheless, on the Nation's rail systems an annual average of 7 fatalities, 55 injuries, and $20,631,111 in property damage occurs that could be prevented by PTC-type systems.[2] The implementation of other pending rule changes and industry actions could play a role in further reducing these numbers. At the same time, traffic and system density are expected to continue to grow, and the extent to which these factors interact has not been clearly resolved.

In 1994, the FRA reported to the Congress on this problem, calling for implementation of an action plan to deploy PTC systems (*Railroad Communications and Train Control*, July 1994). The report forecast substantial benefits of advanced train control technology to support a variety of business and safety purposes, but noted that an immediate regulatory mandate for PTC could

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[2]Conservative estimates based upon prevention of events addressed by "Level 3" systems, as described in this report (not including events evaluated as questionable).

not be currently justified based upon normal cost-benefit principals relying on direct safety benefits. The report outlined an aggressive Action Plan implementing a public/private sector partnership to explore technology potential, deploy systems for demonstration, and structure a regulatory framework to support emerging PTC initiatives.

Following through on the Report, the FRA committed approximately $40 million through the Next Generation High Speed Rail Program and the Research and Development Program to support development, testing and deployment of PTC prototype systems in the Pacific Northwest, Michigan, Illinois, Alaska, and the Eastern railroads' on-board electronic platform. As called for in the Action Plan, the FRA also initiated a comprehensive effort to structure an appropriate regulatory framework for facilitating PTC and for evaluating future safety needs and opportunities.

In September of 1997, the Federal Railroad Administrator asked the Railroad Safety Advisory Committee to address the issue of Positive Train Control. A Working Group was established, comprised of representatives of labor organizations, suppliers, passenger and freight railroads, and interested State departments of transportation. The Working Group was supported by the FRA counsel and staff, analysts from the Volpe National Transportation Systems Center, and advisors from the NTSB staff. The Working Group decided to operate through a Standards Task Force and a Data and Implementation Task Force (which had primary responsibility for drafting this document). This report is a consensus product of the Working Group, which is continuing its efforts.

As this work has gone forward, other collaborative efforts, including development of Passenger Equipment Safety Standards (including private standards through the American Public Transit Association), Passenger Train Emergency Preparedness rules, and proposals for improving locomotive crashworthiness (including improved fuel tank standards) have targeted reduction in collision/derailment consequences.

What is PTC?

The Working Group began its efforts by defining PTC core features as follows:

a. Prevent train-to-train collisions (positive train separation).

b. Enforce speed restrictions, including civil engineering restrictions (curves, bridges, etc.) and temporary slow orders.

c. Provide protection for roadway workers and their equipment operating under specific authorities.

The Working Group identified additional safety functions that might be included in some PTC architectures:

- Provide warning of on-track equipment operating outside the limits of authority.

- Receive and act upon hazard information–when available–in a more timely and/or more secure manner (e.g., compromised bridge integrity, wayside detector data).

- Future capability: Generate data for transfer to highway users to enhance warning at highway-rail crossings.

The Working Group stresses that efforts to enhance highway-rail crossing safety must recognize the train's necessary right of way at grade crossings. In addition, it is important that warning systems employed at highway-rail crossings be highly reliable and "failsafe" in their design.

Principal Findings

1. Effective PTC systems can prevent certain types of collisions and derailments. The Working Group's Accident Review Team analyzed thousands of accident/incident records and concluded that, depending upon the sophistication of the PTC system, approximately 40 to 60 main line collisions and derailments, including train incursions into authorized work zones, could be prevented by PTC each year. Because average train densities are rising as service increases, there is reason to believe that PTC may be needed even more in the future to protect the safety of railroad operations.

2. With adequate investment and proper planning, PTC systems can be built to serve the needs of the general freight rail system and intercity and commuter passenger railroads. The railroads have invested tens of millions of dollars in developing and demonstrating pilot versions of PTC systems, and they remain convinced that contemporary electronic technology provides an opportunity to develop more advanced forms of train control. The international signal and train control, telecommunications, and other supply communities are offering a variety of PTC products for future applications.

3. Although PTC systems configured for the general rail system are not available currently "off-the-shelf," planning and development are underway to produce such systems. PTC systems configured to be affordable for the bulk of the national rail system will likely utilize–

   - the Global Positioning System (GPS) with differential augmentation as the foundation, but not sole input, of its train location system,

   - data-link radio as a principal communications medium between trains and controlling computers,

   - on-board computers to prevent train-to-train collisions, enforce speed limits, and protect roadway workers, and

   - wayside interface units to relay information available in the field to controlling computers, among other features.

Most of the hardware and some of the software associated with these elements is already available, and some of it is being implemented in the railroad industry on a piecemeal basis for other purposes. Testing has shown that basic PTC safety functions can be successfully and practically executed in the field. However, planning for PTC system integration is not complete. The most complex software is yet to be written in a form that could be readily applied to a variety of route systems and easily interfaced with related systems such as dispatch center computers, existing signal systems, and the like. The Working Group is confident that these additional challenges can be met, but cautions that each stage of development must be completed in sequence. Adequate validation and verification of software systems, and proper training of system operators will ensure that additional risks introduced with the system are addressed.

4. PTC systems must be interoperable if safety benefits are to be realized and costs are to be contained. Interoperability (defined in this report as relating to the ability of trains to move from one railroad to another under the control of the host railroad's PTC system) will be critical because extensive track rights arrangements and joint terminal operations cause lead locomotives from several railroads to be intermingled on the same lines. Under increasingly common "power sharing" arrangements, entire trains transit the lines of two or more railroads from origin to destination without changing locomotives. In theory, PTC systems can be designed to provide interoperability among many systems with widely disparate architectures. However, such an approach would result in heavy reliance on very complex software and the necessity for each locomotive to carry in its on-board computer hardware and software for a variety of systems. The Working Group noted that–for PTC systems–complexity and variety are the enemy of economy and availability.

5. Interoperability can be achieved with compatible architectures that incorporate different levels of functionality. Railroads will need flexibility to deploy systems that meet their service needs without unnecessary expense.

6. PTC development efforts now underway have the potential to produce interoperable, effective technology. The Illinois project described in this report, which includes participation by the State of Illinois, the FRA and the Association of American Railroads, is serving as the venue for developing interoperability standards for PTC, for which completion is expected later this year. That same project is the only current effort by the railroads to develop a form of PTC that could replace existing methods of train operation and increase capacity on existing rail lines (through "flexible blocks" that reflect the current position and speed of the train rather than pre-established segmenting of the line between fixed signals). The Communication Based Train Management System (CBTM) being developed by CSX Transportation, and the Alaska Railroad's PTC effort, provide promising approaches directed at non-signalized territory, and the Michigan high-speed project seeks to demonstrate the practicability of using the existing signal system as a foundation for a PTC system. Yet these disparate systems need to reconciled with respect to interoperability if they are to fulfill their potential, based upon the new industry standards promised this year.

7. Estimated costs for implementation of very capable PTC systems are now higher than the Association of American Railroads provided estimates for FRA's 1994 report. An Economic

Team formed from members of the Working Group's Data and Implementation Task Force estimated cost ranges for installation of PTC on the Nation's rail lines. The team first estimated unit costs of accident items, settling on willingness to pay to avoid figures of $2,700,000 per fatality, and $100,000 per injury, except in passenger service, where an injury was estimated to cost $55,000. Further, the team looked at real company figures from a Class 1 freight railroad, and determined that reported damage to track and equipment accurately represented societal costs. There were several other factors analyzed, but the overwhelming bulk of potential benefits would come from those avoiding fatalities, injuries and damage to railroad property.

The team next analyzed the costs of components of PTC systems, using real world experience of team members as a guide, and passing the results on to a supplier for further scrutiny and comment. The team then applied its estimates to the five largest (now four) Class 1 railroads, which at the time included Conrail. That does not imply that the team thought it would be wise to apply PTC to the entire systems of those railroads. There probably are deployment strategies which would be much more cost-effective. The team found that it would cost about $1,200,000,000 to equip all of the lines of those railroads with a level 1 type PTC system (addresses "core" PTC functions only), and about $7,800,000,000 to equip all of their lines with a level 4 type PTC system (increased functionality addresses additional safety monitoring systems and enhanced traffic management capabilities). These costs are total discounted life cycle costs, including procurement, installation and maintenance, over 20 years.

The team then compared the costs of applying PTC to the benefits, again using the five largest Class 1 freight railroads, including Conrail. The 20 year total discounted benefits ranged from about $500,000,000 for a level 1 PTC system, to about $850,000,000 for a level 4 PTC system. When the costs are compared to the benefits, it is clear that PTC would become cost-effective only if the costs were to decrease because of technological improvement, if the efficiency would be increased because of a more selective deployment, if the willingness to pay to avoid a fatality were to increase, or if PTC were to become a necessary condition for implementing productivity improvements, or if some combination of these were to occur.

8. Because of the costs involved and the time required to complete development of PTC systems that could fully control train movements, less ambitious approaches merit examination. The history of efforts to develop complex computer-based technology suggest that unanticipated difficulties can arise and require additional time to adjust and "de-bug" the software. Further, the date by which fully capable PTC may be available at an affordable cost is not clearly determined. Accordingly, several railroads have conceived of systems addressing the PTC core functions that rely more heavily (or exclusively) on on-board equipment. These systems, which the Economic Team estimated could be deployed for as little as $591 million (initial costs), deserve full evaluation because of their potential for early implementation.

Issues for which the Working Group was unable to make findings as this report was finalized included the extent to which risk of PTC-preventable events by line segment characteristics (e.g., traffic density, switches, curvature, etc) can be forecasted to help target investments in safety systems. The Working Group has served as a peer review body for development by the Volpe National Transportation Systems Center of a Corridor Risk Assessment Model. This effort seeks

to analyze risk using a geographic information system platform and statistical tools. Working Group contributions have led to substantial revisions in the study methodology, and as this report was submitted the Working Group was beginning to review the results of the modeling effort. In addition, the Volpe Center was conducting a validation test using data for preventable events for a two-year period subsequent to the study period.

Conclusions and Recommendations

The RSAC notes with approval encouraging advances in the use of train control technology for safety. As early as October of 1999, Amtrak will implement an advanced civil speed enforcement system (ACSES) on the Northeast Corridor (NEC) from New Haven to Boston; and shortly thereafter, New Jersey Transit Rail Operations (NJT) will implement a compatible technology on its lines. In combination with the cab signal/automatic train control system already in place on the NEC, these systems are expected to provide interoperable PTC core features on the entire NEC, as well as on NJT lines, in the future.

Developments on the NEC will help build confidence in PTC technology, but the systems involved are not directly transferable to the needs of freight and passenger operations outside of electrified territory (where, in general, there is no existing cab signal system on which to build). Nevertheless, progress toward resolution of technical issues related to deployment of PTC systems across the breadth of the freight railroad network is also underway. The Union Pacific/Burlington Northern Santa Fe "PTS" project showed once again that train braking distances can be successfully calculated on-board and that GPS/DGPS positioning can provide the foundation of a successful train location system in multiple-track territory. That project also illustrated the use of data from an existing traffic control system as an element of an "overlay" type PTC architecture. The Alaska Railroad PTC project will yield further confidence that PTC can be implemented in non-signal territory with excellent results.

Much remains to be done. The PTC Working Group concluded PTC systems can be successfully deployed if they are affordable and if appropriate care is taken in their design, testing and deployment. The primary obstacle is cost. Although estimates of system costs have increased substantially since the FRA last sought data on this issue in 1994, there are persuasive reasons to believe that costs will become manageable in the future:

- The cost of consumer and industrial electronic systems continues to fall in relation to the value of products.

- Price quotations for PTC applications are likely to be reduced in larger quantities.

- Railroads are currently making investments in more capable computer-aided dispatching systems that incorporate sophisticated traffic planners. These and other investments are necessary to realize the benefits of more capable PTC systems, such as those that may offer capacity enhancements through "flexible-block" management of train separation.

- Locomotive manufacturers, supported by the AAR, are working toward more capable and better-integrated cab electronics. Items that are necessary PTC system components, such as

GPS/DGPS receivers, electronic display screens, and electronic control of brakes and throttle. are already being offered as basic equipment on new locomotives.

- The Illinois Project provides a venue for joint systems development that, if it is sufficiently sophisticated and modular in design, may provide the foundation for successful applications on freight railroads and passenger railroads operating outside of electrified territory, greatly reducing the cost of system development on other properties.

- Successful integration of the eastern railroads' "common bus" concept could support interoperability of systems, if adequate standards are in place.

- Innovative ideas for on-board systems that could simplify the achievement of certain PTC functions may offer promise to bridge the gap between today and full PTC implementation, if the electronic systems are forward-compatible with future technologies.

- The rapid growth of other electronic systems will create new opportunities for synergistic applications of PTC, such as providing a data network that can monitor, in real time, the health and status of cars, car components, and commodities (especially hazardous materials).

Without question, a partnership effort involving public and private sector participants is required to bring about the successful implementation of PTC systems. The Working Group makes the following recommendations to support deployment of PTC technology by creating a favorable climate and by systematically resolving technical and institutional barriers to implementation:[3]

To the Department of Transportation and the Federal Railroad Administration:

1. Complete the Nationwide Differential GPS network with redundant coverage throughout the continental U.S., including Alaska, providing a uniform and consistent position determination, velocity, and timing system for PTC and other Intelligent Transportation Systems.

   Status: Completion expected no later than 2003.

2. Continue support for retention and review of radio frequency spectrum allocations sufficient to support PTC and other necessary railroad communications services.

   Status: The Federal Communications Commission spectrum "refarming" decisions were favorable; the AAR is further reviewing spectrum needs.

3. Work to ensure that appropriate resources and investments are available to implement PTC technology that will support the safety and viability of rail passenger service, emphasizing the choice of interoperable systems that can hold down public and private sector costs

[3]FRA staff members have participated in the development of this report. However, since development of policy within the Executive Branch of the United States Government requires coordination and clearance not feasible within the time available for preparation of this report, conclusions and recommendations related to Federal action should be viewed as the opinions of the non-Federal members of the RSAC.

Status: Funding provided thus far includes Illinois and Michigan high-speed PTC, support for ACSES system through Amtrak capital budget. The FRA is working with the FTA and commuter authorities regarding future plans.

4. Maximize investment opportunities under TEA-21 to support deployment of the Railroad Infrastructure Financing program, which, with $3.5 billion in authority, represents an excellent opportunity to provide capital for these investments.

   Status: DOT has stated that it is implementing TEA-21 with the maximum emphasis on intermodal funding approaches. The NPRM to implement the RRIF program was published on May 20, 1999.

5. Through RSAC–

   a) Evaluate results of the Corridor Risk Assessment Model to determine if the distribution of risk on the rail system offers notable opportunities for collision and derailment prevention by focusing initial PTC installations on certain rail corridors (ongoing).

   b) Further evaluate benefits and costs of PTC on business-scale corridors (begin 3rd quarter 1999).

   c) Develop human factors analysis methodology to project the response of crews and dispatchers to changes brought about by "overlay" type PTC technology, including possible "reliance" or "complacency" and "distraction" effects (initiated 2nd quarter 1999). Apply methodology to candidate projects.

   d) Develop guidelines for standard operating rules applicable to various forms of PTC systems, with particular attention to issues regarding unequipped trains and trains with failed on-board equipment (begin 3rd quarter 1999).[4]

   e) Complete development of proposed performance-based standards for processor-based train control systems (ongoing).

   f) Produce a risk measurement toolset for a safety-critical assessment process (ongoing).

   g) Using available analytical tools, evaluate the safety merits of candidate systems.

6. With the railroads and other interested parties, continue to work with the Intelligent Transportation System (ITS) program to ensure that standards are developed for ITS User Service #30, Highway-Rail Intersections, including appropriate interfaces and messages (e.g., train locations, directions, speed, grade crossing occupancy) between PTC and Intelligent Transportation Systems.

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[4] References to trains in this document are, in most cases, inclusive of locomotives and other on-track equipment including roadway maintenance machines, hi-rail vehicles, and other equipment which routinely occupy track under authority of mandatory directives or operating rules.

Status: Initial standards development workshop Arlington, VA, July 22 and 23, 1999.

7. Through the Federal Highway Administration and ITS America, foster deployment of in-vehicle systems capable of appropriately utilizing data provided through PTC or other systems to warn motor vehicle drivers of the need to yield to trains at highway-rail grade crossings.

   Status: Ongoing.

8. Promote prudent research and development to enhance the potential for ITS and allied technologies to advance safety at highway-rail grade crossings by other means. For example, remote monitoring systems could warn train control centers and/or traffic management centers of highway vehicles fouling the crossing and/or failures of active warning system equipment.

   Status: Ongoing.

To the Association of American Railroads:

9. Complete standards for PTC interoperability in 1999.

   Status: Workshops underway.

To the AAR, State of Illinois and the FRA:

10. Through the Illinois project–

    a) Develop and deploy a PTC system adequate to support high-speed passenger service and freight operations with flexible block technology.

    b) Ensure that the PTC system is modular in design so that it can used to support the safety of railroad operations on other corridors.

    c) Ensure that decisions on technology applications and interoperability in the Illinois project will facilitate decisions by passenger rail systems regarding investment in compatible technology.

    d) Coordinate with the eastern railroads' project for development of a "common bus" and the locomotive manufacturers' efforts to provide integrated on-board electronics platforms to maximize the likelihood that interoperability will be achieved at an affordable cost and at an early date.

The Working Group appreciates the support provided by member organizations and recommends that its tasks (RSAC No. 97-4, 97-5, and 97-6) be continued consistent with Recommendation 5 above, with the expectation that the Working Group will make further reports and recommendations necessary to achieve its mission, including proposed performance standards for PTC systems.

IDOT PTC Demonstration Corridor

Union Pacific Railroad

Joliet and Springfield Subdivisions

ATCS Coverage Map

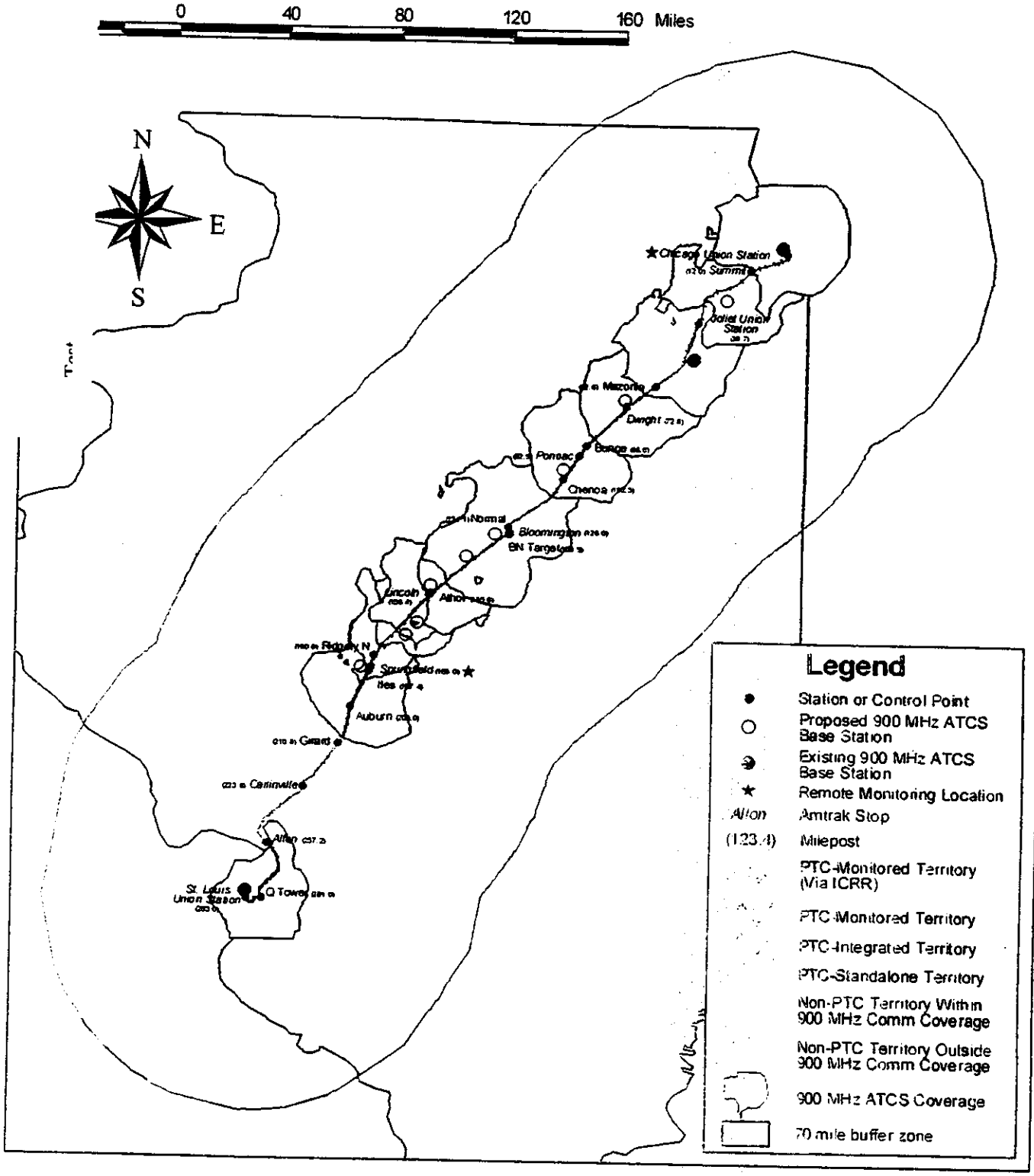

Exhibit E to Comments of
Association of American Railroads
ET Docket No. 02-135
July 8, 2002

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)
	)
Petition of Association of American Railroads (AAR) for Modification of Licenses For Use in Advanced Train Control Systems and Positive Train Control Systems	)

ORDER

Adopted: February 13, 2001 **Released:** February 15, 2001

By the Chief, Public Safety and Private Wireless Division, Wireless Telecommunications Bureau:

I. INTRODUCTION

1. We have before us a petition for modification of licenses (Petition) filed by the Association of American Railroads (AAR) on March 24, 2000.[1] AAR, which is the licensee of over three hundred private land mobile radio (PLMR) call signs in connection with an Advanced Train Control System (ATCS), seeks to modify these licenses to receive a single geographic area license. For the reasons set forth below, we grant AAR's Petition.

II. BACKGROUND

2. In 1986 and 1987, AAR, which represents virtually every major American railroad, filed hundreds of PLMR applications for thousands of base stations, seeking authorization to use six specific frequency pairs in the 900 MHz band.[2] Specifically, AAR requested licenses for these frequency pairs to facilitate the construction and development of an ATCS,[3] which is now referred to as Positive Train Control (PTC).[4] These frequencies were to be used to build the largest and most complex land mobile radio communications system in the world, enabling the transfer of large volumes of data between locomotives, work crews, and computerized control centers.[5] AAR envisioned that implementation of the ATCS would automate rail operations nationwide, enabling railroads to operate more safely,

[1] Association of American Railroads Petition for Modification of Licenses, filed March 24, 2000 (*Petition*). In addition, AAR filed corresponding modification applications on April 18, 2000.

[2] The six frequency pairs are 896.8875/935.8875 MHz, 896.9375/935.9375 MHz, 896.9875/935.9875 MHz, 897.8875/9375 MHz, 897.9375/936.9375 MHz, and 897.9875/936.9875 MHz.

[3] Waiver of Sections 90.621(d), 90.623(a), 90.629, 90.633, and 90.651(c) of the Commission's Rules to License Use of Six Conventional 900 MHz Frequency Pairs for an Advanced Train Control System, *Order*, 3 FCC Rcd 427, 427 ¶ 2 (1988) (*Order*). AAR also indicated that it intended to file additional applications for hundreds of other sites it had yet to identify. *Id.* at 427 ¶ 3, 429 ¶ 19.

[4] *Petition* at 3.

[5] *Order*, 3 FCC Rcd at 427 ¶¶ 1, 4.

efficiently, and economically.[6] For example, the system was designed to prevent train collisions, high speed accidents, and incursions into locations reserved for railway workers.[7] Because some of the ATCS's operating requirements could not be met under the Commission's regulations, AAR sought a waiver of Sections 90.621(d) (providing a means for achieving exclusivity by a seventy-mile protection contour for stations meeting loading requirement), 90.623(a) (limiting the number of channels that may be assigned to a licensee for operation in the conventional mode to five), 90.629 (limiting extended implementation periods to three years), 90.629(b) (requiring annual progress reports by licensees with extended implementation periods, and providing that exclusivity for conventional channels cancels automatically if the implementation schedule is not met), 90.633(a) (setting a loading requirement of seventy mobile units), 90.633(c) (requiring construction within eight months of license grant unless an extended implementation period is granted), and 90.651(c) (requiring loading report within eight months of license grant) of the Commission's Rules.[8]

3. In 1988, the Commission granted AAR's request.[9] The Commission allowed AAR ten years in which to complete the proposed ATCS project.[10] Rather than grant AAR the exclusive use of the six frequencies nationwide, as AAR had requested,[11] the Commission established an eighty-mile zone of protection around each site for the duration of the ten-year construction period, and provided that applicants for those channels outside this zone would first have to seek alternative 800 and 900 MHz frequencies.[12] The *Order* required that AAR submit a final report at the end of the ten-year period identifying the locations of all base stations and the number of mobile units associated with those stations.[13] In order to retain exclusivity after ten years (in the form of a seventy-mile zone of protection), AAR would have to demonstrate that it met the loading requirements.[14] For those stations not meeting the requisite loading criteria, the Commission stated that it would consider applications from other users on the six frequencies if the proposed operations would not threaten rail safety.[15] The Commission also stated that it would still require other applicants for the six frequencies to exhaust alternative channels first.[16]

4. In its final report, AAR certified that all the licensed stations were constructed and the

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[6] *Id.*

[7] *Id.*

[8] 47 C.F.R. §§ 90.621(d), 90.623(a), 90.629, 90.629(b), 90.633(a), (c), 90.651(c) (1988).

[9] *Order*, 3 FCC Rcd at 430 ¶ 25.

[10] *Id.* at 428 ¶ 15.

[11] *See id.* at 429 ¶ 18.

[12] *Id.* at 429 ¶ 21.

[13] *Id.* at 429 ¶ 22.

[14] *Id.*

[15] *Id.*

[16] *Id.*

loading requirements were met. In accordance with the policies set forth in the *Order*, to date, no other PLMR licensees have been authorized to use the six frequencies licensed to AAR for ATCS use. In the years since the licenses were originally granted, AAR has relocated or otherwise modified a number of sites; in each case, this has required the filing of an individual modification application.[17]

5. On March 24, 2000, AAR filed the instant Petition seeking to modify its ATCS licenses by consolidating them into a single geographic area license. On May 26, 2000, the Public Safety and Private Wireless Division of the Wireless Telecommunications Bureau released a *Public Notice* seeking comment on AAR's proposal.[18] Comments were filed by the Federal Railroad Administration (FRA), the federal agency responsible for setting railroad standards, and the Industrial Telecommunications Association (ITA), a FCC-certified PLMR frequency coordinator. AAR filed reply comments.

III. DISCUSSION

6. AAR's Petition seeks modification of the licenses for its ATCS/PTC stations into a single geographic area license. Under AAR's proposal, the scope of the modified license would be defined as a seventy-mile zone on either side of the rights-of-way of all operating rail lines in the United States.[19] If its Petition is granted, AAR plans to issue sub-licenses to the individual railroads that use ATCS/PTC, and will maintain a computerized database of all site-specific information pertaining to such sub-licenses.[20] In addition, the FCC and FCC-certified PLMR frequency coordinators will have access to the AAR database via the Internet.[21] AAR also will provide the Commission and frequency coordinators with access to a software program that determines whether any given point in the United States is within the seventy-mile zone.[22]

7. AAR argues that its proposal, by eliminating the need for the filing and review of an individual modification application every time an ATCS/PTC station is relocated, will both streamline the Commission's licensing processes and provide AAR with needed flexibility in choosing where to deploy ATCS/PTC base stations.[23] We agree with AAR and FRA[24] that implementation of this proposal would enhance administrative efficiency for both the Commission and AAR; moreover, we believe that

[17] *See id.* at 430 n.8 (providing that if AAR needed to move a base station, it would have to follow the standard procedures for modifying a license). Most of the current authorizations expire in 2003.

[18] Wireless Telecommunications Bureau Seeks Comment on Association of American Railroads Petition for Modification of Licenses for Use in Advanced Train Control Systems and Positive Train Control Systems, *Public Notice*, 15 FCC Rcd 9133 (WTB PSPWD 2000).

[19] *Petition* at 4.

[20] *Id.* at 4-5.

[21] *Id.*

[22] *Id.* at 23.

[23] *Id.* at 21.

[24] *See* FRA Comments at 1.

such a streamlining is in the public interest.[25] We also find that such a licensing approach will result in improvements to the safety of train operations in general, because the increased flexibility inherent in a geographic area license should facilitate the deployment of current and future ATCS/PTC facilities.[26] AAR also argues that granting its Petition will ensure that the railroads' safety-critical communications data links continue to be protected from interference,[27] while at the same time promoting full spectrum utilization by allowing the six channel pairs to be fully accessed by non-railroad users outside the boundary of the geographic license.[28] Finally, AAR notes that the Canadian government has licensed the six 900 MHz channel pairs used for ATCS/PTC under a single nationwide, geographic area license to the Railway Association of Canada.[29] AAR argues that we should conform the United States licensing with that of the Canadian government. We agree that international harmonization would further the public interest by contributing to smooth transborder operations.

8. ITA, on the other hand, contests AAR's assertion regarding full spectrum utilization. First, ITA suggests that 140 miles is "perhaps excessive" in light of the fact that the area to be served will be limited to the railroad tracks, a comparably small area.[30] Second, ITA contends that a 140-mile wide zone of protection will limit the promotion of full utilization of the spectrum to non-critical rural areas.[31] Third, ITA questions whether "interference with railroad communications in the 900 MHz Industrial/Land Transportation Pool is a critical issue," and urges us to seek documentation of any interference complaints or concerns.[32] ITA also is concerned that coordinating these frequencies for non-railroad use will be difficult because it will not be able to identify and define the 140-mile wide protected area surrounding the railroads' rights-of-way.[33]

9. Based on the record in this proceeding, we conclude that AAR's ATCS licenses should be modified as requested. We agree with AAR that the 140-mile protection zone is reasonable because it is derived from the fixed seventy-mile separation distance between co-channel stations set forth in Section 90.621(b) of the Commission's Rules.[34] In addition, we find persuasive AAR's explanation that the

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[25] *See, e.g.*, 1998 Biennial Review – Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules, *Second Report and Order*, FCC 00-368, ¶ 6 (rel. Nov. 1, 2000).

[26] Congress recognized in the Balanced Budget Act of 1997 that railroad radio communications are used to protect the safety of life and property. *See* Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended, *Report and Order and Further Notice of Proposed Rule Making*, FCC 00-403, ¶¶ 75-76 (rel. Nov. 20, 2000) (citing H.R. Conf. Rep. No. 105-217, 105th Cong., 1st Sess. at 572 (1997)).

[27] *Petition* at 9.

[28] *Id.* at 21-22.

[29] Petition at 4. The Railway Association of Canada is AAR's Canadian counterpart.

[30] ITA Comments at 2.

[31] *Id.*

[32] *Id.* at 2-3.

[33] *Id.* at 2.

[34] AAR Reply Comments at 4.

reason that there have been no complaints of interference in connection with the ATCS is that non-railroad users are currently not coordinated on the six ATCS/PTC frequency pairs.[35] Should AAR's proposal be granted, however, non-railroad users will be permitted access to these channels outside of the 140-mile protected zone, and interference could become an issue.[36] The 140-mile protected zone is therefore necessary to ensure the continued integrity of AAR's operations.[37] Regarding ITA's concern that full spectrum utilization will be limited to non-critical rural areas, we agree with AAR that a grant of its proposal will not suddenly limit the availability of spectrum for non-railroad use to non-critical rural areas, because AAR's current licenses are already protected from non-railroad use, and rail lines are clustered around major population centers.[38] Consequently, non-railroad users are already mostly precluded from co-channel operations near these metropolitan areas. Finally, we find that ITA's frequency coordination concerns are addressed by AAR's plan to make available to the Commission and the frequency coordinators a computer software program that will identify all points in the United States that are inside and outside of the area of the geographic license.[39]

IV. CONCLUSION AND ORDERING CLAUSES

10. AAR has persuaded us that significant public safety benefits will be realized by granting its Petition. The importance of an efficient, ubiquitous, and internationally coordinated railroad communications system is apparent, and we believe that this *Order* will facilitate the continued success and development of ATCS/PTC throughout the United States. Therefore, we direct the Licensing and Technical Analysis Branch of the Public Safety and Private Wireless Division to issue a single nationwide geographic area license, defined by a 140-mile wide swath or ribbon that tracks all of the railroad rights-of-way in the United States, to replace AAR's existing site-by-site licenses for the six ATCS/PTC frequency pairs. The modified license shall expire on the expiration date of the earliest-to-expire existing license.[40] As with other geographic area licenses,[41] the licensee may locate, move, or modify its stations anywhere within its 140-mile wide geographic area without obtaining Commission consent, except that AAR must individually license any facility that requires an Environmental Assessment pursuant to Section 1.1307 of the Commission's Rules[42] or international coordination, or would affect the radio frequency quiet zones described in Section 1.924 of the Commission's Rules.[43] In addition, the requirement that any antenna structure that requires notification to the Federal Aviation Administration must be registered with the Commission prior to construction under Section 17.4 of the

[35] *See id.* at 5-6.

[36] *Id.* at 6.

[37] *Id.*

[38] *See id.* at 5.

[39] *See id.* at 3.

[40] *See, e.g.*, Amendment of the Commission's Rules Concerning Maritime Communications, *Fourth Report and Order and Third Further Notice of Proposed Rule Making*, FCC 00-370, ¶ 36 (rel. Nov. 16, 2000); 47 C.F.R. § 22.507(c).

[41] *See, e.g.*, 47 C.F.R. §§ 22.165(a)-(c), 80.371(c)(4), 101.1009(a)(1).

[42] 47 C.F.R. § 1.1307.

[43] 47 C.F.R. § 1.924.

Commission's Rules[44] continues to apply.

11. Accordingly, IT IS ORDERED that, pursuant to Section 4(i) of the Communications Act of 1934, as amended, 47 U.S.C. § 154(i), and Section 1.925 of the Commission's Rules, 47 C.F.R. § 1.925, the Petition for Modification of Licenses filed by the American Association of Railroads on March 24, 2000 IS GRANTED as set forth herein.

12. IT IS FURTHER ORDERED that the Public Safety and Private Wireless Division, Licensing and Technical Analysis Branch SHALL PROCESS the modification applications filed by the American Association of Railroads on April 18, 2000 in accordance with this *Order*.

13. This action is taken under delegated authority pursuant to Sections 0.131 and 0.331 of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

D'wana R. Terry
Chief, Public Safety and Private Wireless Division
Wireless Telecommunications Bureau

[44] 47 C.F.R. § 17.4.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing "Comments of the Association of American Railroads in ET Docket No. 02-135" was mailed by first class mail, postage prepaid, on the 8th day of July, 2002, to each of the following:

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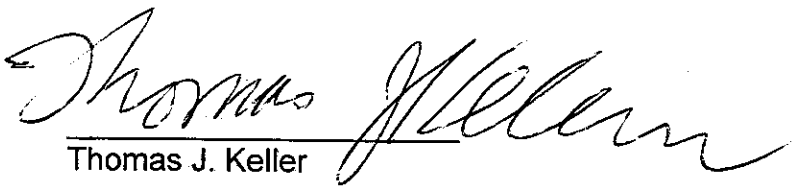

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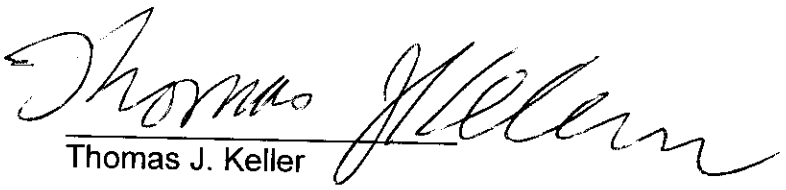

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